

38. (Amended) An apparatus for the remote detection of selected trace constituents in flue gases, in use with an installation comprising at least one stack for discharging flue gases to the atmosphere and at least one building providing an enclosed area, the apparatus comprising:

- B<sup>2</sup>
- (a) a laser tuneable over a range of frequencies for generating a laser beam;
  - (b) control means to control the frequency of the laser to rapidly scan across an absorption range encompassing an absorption line of a selected trace constituent of interest;
  - (c) transmission means to transmit the laser beam through the flue gas;
  - (d) detection means for detecting the laser beam after transmission through the flue gas;
  - (e) processing means for providing the concentration of the selected trace constituent by comparing the detected laser beam to the transmitted laser beam;
  - (f) a multiplexer means providing a connection between the laser and the transmission means and between the detection means and the processing means; and
  - (g) an optical fiber connection means providing a connection between a laser and the optical transmission means and between the detection means and the processing means;
- wherein the transmission means and the detection means are mounted to one stack adjacent the top thereof, whereby a laser beam is transmitted through the flue gases discharged in the stack, and wherein the laser, the detection means and the multiplexer means are located in the enclosed area of the building, whereby the laser, the detection means and the multiplexer means are protected by the building, the pairs of optical transmission means and detection means are remote from the laser and the detection means and are connected thereto by the optical fiber connection means, and the multiplexer means can selectively connect the laser to any one pair of the optical transmission means and the detector means.
- P<sub>1</sub>

45. (Amended) A method of monitoring selected trace constituents in exhaust gases, the method comprising:

- B<sup>3</sup>
- (a) transmitting a laser beam tuneable over a range of frequencies through the exhaust gas;
  - (b) controlling the frequency of the laser to scan rapidly across an absorption range encompassing an absorption line of a selected trace constituent of interest;
  - (c) detecting the transmitted laser beam after transmission of the beam through the exhaust gas; and

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(e) determining the concentration of the selected trace constituent by comparing  
the detected laser beam to the transmitted laser beam.